

Claims

1. A connector which comprises the male portion of a luer connector, characterized in that
the male portion 132 is extended axially into a pressure pad (8) having a pressure surface.
2. A device for passing fluid into an annular cavity between an inner elongate body (126) and an outer elongate tubular body (128), the device having a housing (2) with a distal end (24), a proximal end (112) and an off-axis end (136), the housing providing a seating at the distal end thereof for the outer elongate tubular body along an axis of the housing extending between the proximal and the distal end, the distal and off-axis ends defining respective openings (130, 131) which are in fluid communication with each other, and the proximal end having a lumen (123) to enable the inner elongate body to extend from the housing both distally and proximally, along the axis thereof:
characterized by:
a pressure pad (8) mounted to the housing and extending into the cavity from the off-axis opening of the housing and movable between a locking disposition, in which the pad (8) bears on the locus of the inner elongate body (126) for preventing axial movement thereof with respect to the outer body (128), and simultaneously allows injection of fluid into the annular cavity (130), and a release disposition in which the pad is spaced from the locus of the inner elongate body for permitting axial movement of the inner body with respect to the outer body.
3. Stent delivery system comprising an inner elongate body (126) and an outer elongate tubular body (128) which are coaxially arranged, a pull-back device (170)

enabling proximal displacement of the outer body with respect to the inner body for releasing a stent contained within an annular cavity formed between the inner and outer body, into a body lumen, a device (1) for passing fluid into the annular cavity having a housing (2) with a distal end (124), a proximal end (112) and an off-axis end (136), the housing provides a seating at the distal end thereof for the outer elongate tubular body along an axis of the housing extending between the proximal and the distal end, the distal and off-axis ends defining respective openings (30, 31) which are in fluid communication with each other, and the proximal end having a lumen (23) to enable the inner elongate body to extend from the housing both distally and proximally, along the axis thereof, the stent delivery system being characterized by

a locking and release device (1) mounted to the housing (2) and extending into the off-axis opening of the housing to bear, in a locking disposition, against the inner body to prevent axial movement thereof with respect to the outer body, and to simultaneously allow injection of fluid into the annular cavity and, in a released disposition, to be spaced from the inner body to permit axial movement of the inner body with respect to the outer body.

4. A device (1) for releasing into the body from a delivery system a medical prosthesis mounted on the delivery system and held by a constraint (16) in a constrained delivery disposition, the device comprising:

a first abutment (28) for the delivery system;

a second abutment (18) for an elongate element (30) to connect the device to the prosthesis constraint;

a track (14) for the second abutment (18) to advance along, from a starting point corresponding to constraint of the prosthesis, to a finishing point corresponding to separation of the prosthesis and constraint (16);

ratchet means (38) to advance the second abutment (18) progressively, from the starting point to the finishing point, in a plurality of actuation strokes; and

characterized by:

a full stroke actuator (24), to advance the second abutment (18) all the way from an intermediate point on said track (14) to said finishing point in one single stroke of the said actuator (24), the intermediate point being selectable by the user within a portion of the track (14) which extends over at least half the length of the track.

5. A method for releasing into the body from a delivery system a medical prosthesis mounted on the delivery system and held by a constraint in a constrained delivery system, the method comprising

a first release phase characterized by stepwise release of a first portion of the prosthesis, by successive actuation strokes of a ratchet means, followed by

a second phase of release of the prosthesis, characterised by a single stroke of a full stroke prosthesis release actuator.

6. A medical device delivery system for therapeutically treating a patient, comprising:

an inner shaft, having proximal and distal ends;

a tubular outer sheath, at least a portion of which surrounds a portion of the inner shaft member;

a medical device within the outer sheath in an initial configuration;

a handle operatively coupled with the inner shaft and the outer sheath;

the handle having a first and second actuator for adjusting the relative positions of the inner shaft and the outer sheath, each of the first and second actuators providing a different amount of mechanical advantage between an input to one of the first and

second actuators by a physician and a resulting relative position of the inner shaft and the outer sheath respectively.

7. The medical device delivery system of claim 6, wherein one of the first and second actuators provides a mechanical advantage of 1:1.

8 The medical device delivery system of claim 6, wherein the second actuator is adapted to slide along a longitudinal slot defined by the handle.

9. The medical device delivery system of claim 6, wherein one of the first and second actuators is formed as a lever.

10. The medical device delivery system of claim 6, wherein the first actuator provides a mechanical advantage greater than 1:1, to facilitate an operator to overcome initial resistance to changing the initial relative position of the inner shaft and the outer sheath.

11. A handle for manipulating a medical device delivery system for therapeutically treating a patient, comprising:

a housing;

inner and outer shaft members;

the inner shaft member being affixed to the housing;

the outer shaft member being movably coupled to the inner shaft member, such that the outer shaft member can be moved longitudinally with respect to the inner shaft member;

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first and second means for selectively moving the outer shaft member with respect to the inner shaft member;

the first means being adapted for precise and sensitive adjustment of the position of the outer shaft member, and the second means being adapted for rapid and relatively large-scale movement of the outer shaft member.

12. A medical device delivery system for therapeutically treating a patient, comprising:

- an inner shaft, having proximal and distal ends;
- a tubular outer sheath, at least a portion of which surrounds a portion of the inner shaft member;
- a medical device within the outer sheath in an initial configuration;
- a handle operatively coupled with the inner shaft and the outer sheath;
- the handle having a first and second actuator for adjusting the relative positions of the inner shaft and the outer sheath, each of the first and second actuators providing a different amount of mechanical advantage between an input to one of the first and second actuators by a physician and a resulting relative position of the inner shaft and the outer sheath respectively; and
- a locking member that releasably holds the outer sheath relative to the inner shaft in an initial configuration, thereby holding the outer sheath in the initial configuration and tending to resist inadvertently uncovering the medical device.

13. The medical device delivery system of claim 12, wherein the first actuator provides a mechanical advantage of 1:1.

14. The medical device delivery system of claim 12, wherein the first actuator is adapted to slide along a longitudinal slot defined by the handle.

15. The medical device delivery system of claim 12, wherein the second actuator provides a mechanical advantage greater than 1:1, to facilitate an operator to overcome initial resistance to changing the initial relative position of the inner shaft and the outer sheath.

16. The medical device delivery system of claim 12, wherein one of the first and second actuators is formed as a lever.

17. The medical device delivery system of claim 12, further comprising a guidewire lumen for slidably receiving a flexible guidewire.

18. The medical device delivery system of claim 12, wherein the medical device is a stent.

19. The medical device delivery system of claim 18, wherein the stent is of the self-expanding type.

20. A handle for manipulating a medical device delivery system for therapeutically treating a patient, comprising:

a housing;

first and second shaft members;

the first shaft member being affixed to the housing;

the second shaft member being movably coupled to the first shaft member, such that the second shaft member can be moved longitudinally with respect to the first shaft member;

first and second means for selectively moving the second shaft member with respect to the first shaft member;

the first means being adapted for precise and sensitive adjustment of the position of the second shaft member, and the second means being adapted for rapid and relatively large-scale movement of the second shaft member;

and a locking member that releasably holds the first and second shafts in a constant initial relative position.

21. A method for therapeutically treating a patient, comprising the steps of:

(a) providing a medical device delivery system having proximal and distal ends; a handle near the proximal end; a medical device for delivery by the delivery system and for performing a therapeutic procedure at a desired site for treatment; a delivery mechanism for selectively and progressively releasing the medical device; and a locking member that holds the delivery mechanism in an initial configuration, the locking member tending to releasably resist inadvertent release of the medical device by the delivery mechanism;

wherein the medical device is positioned within the delivery mechanism; wherein the handle has a first and second actuator coupled to the delivery mechanism;

(b) inserting the medical device delivery system along a body passage until the distal end of the delivery system is positioned at or near the desired site for treatment;

(c) unlocking the locking member;

(d) moving the first actuator on the handle a first selected amount; such movement of the first actuator causing the delivery mechanism to move an amount at a

first proportional rate in a precise manner, and causing the delivery mechanism to partially release the medical device;

(e) moving the second actuator on the handle, causing the delivery mechanism to move at a second greater proportional rate in a rapid manner, to fully release the medical device; and

(f) withdrawing and removing the medical device delivery system from the body passage, and allowing the medical device to remain at the desired site for treatment.

22. The method as set forth in claim 21, further comprising, between steps (d) and (e), the additional steps of: evaluating in greater detail the position of the medical device compared to the position of the desired site to be treated; and adjusting the position of the medical device delivery system based on the evaluation.

23. A method for therapeutically treating a patient, comprising the steps of:

(a) providing a medical device delivery system having proximal and distal ends; a handle near the proximal end; a medical device for delivery by the delivery system and for performing a therapeutic procedure at a desired site for treatment; a delivery mechanism for selectively and progressively releasing the medical device; and a locking member that holds the delivery mechanism in an initial configuration, the locking member tending to releasably resist inadvertent release of the medical device by the delivery mechanism;

wherein the medical device is positioned within the delivery mechanism; the handle has a first and second actuator coupled to the delivery mechanism; the first actuator is a rotatable knob; and the second actuator is a longitudinal slider;

(b) inserting the medical device delivery system along a body passage until the distal end of the delivery system is positioned at or near the desired site for treatment;

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(c) unlocking the locking member;

(d) rotating the first actuator on the handle a selected amount; such rotation of the first actuator causing the delivery mechanism to move an amount in a precise manner, and causing the delivery mechanism to partially release the medical device;

(e) sliding the second actuator on the handle longitudinally, causing the delivery mechanism to move in a rapid manner, to fully release the medical device; and

(f) withdrawing and removing the medical device delivery system from the body passage, and allowing the medical device to remain at the desired site for treatment.

24. The method as set forth in claim 23, further comprising, between steps (d) and (e), the additional steps of: evaluating in greater detail the position of the medical device compared to the position of the desired site to be treated; and adjusting the position of the medical device delivery system based on the evaluation.